



# FROM WASTE TO ENERGY

Premium fuel solutions driving the next era of energy recovery

ANDRITZ

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# Fuel of the future with RDF

Refuse-derived fuel (RDF) is a valuable substitute for primary fuels such as gas, oil and coal. ANDRITZ offers modern and efficient processing technologies for RDF production.

RDF is tailored for use as fuel in waste-to-energy facilities or industrial applications. It typically comprises combustible fractions like plastics, paper, and biomass, that have been refined to meet stringent standards governing calorific value, moisture content, and particle size distribution.

Waste processing serves two functions: first, sorting and recycling materials like metals, paper, cardboard, glass, and plastics such as PET, and second, separating and post-shredding waste to achieve targeted calorific values and particle sizes, producing RDFs suitable for specific firing technologies.

The robust ADuro P and ADuro S shredders are used for primary and secondary shredding, and feature fast-change screens for a wide range of output sizes. At the end of the process, the ferrous metals and non-ferrous metals can be recovered with a superior purity of 98% – perfect for use in the steel industry.

ANDRITZ is the market leader in custom waste-to-energy solutions, offering efficient handling of various RDF grades. Drawing on our expert understanding of high-, medium-, and low-calorific RDF grades, ANDRITZ is able to optimize waste-to-energy processes, employing an innovative approach that ensures sustainable solutions for evolving waste management and energy needs.

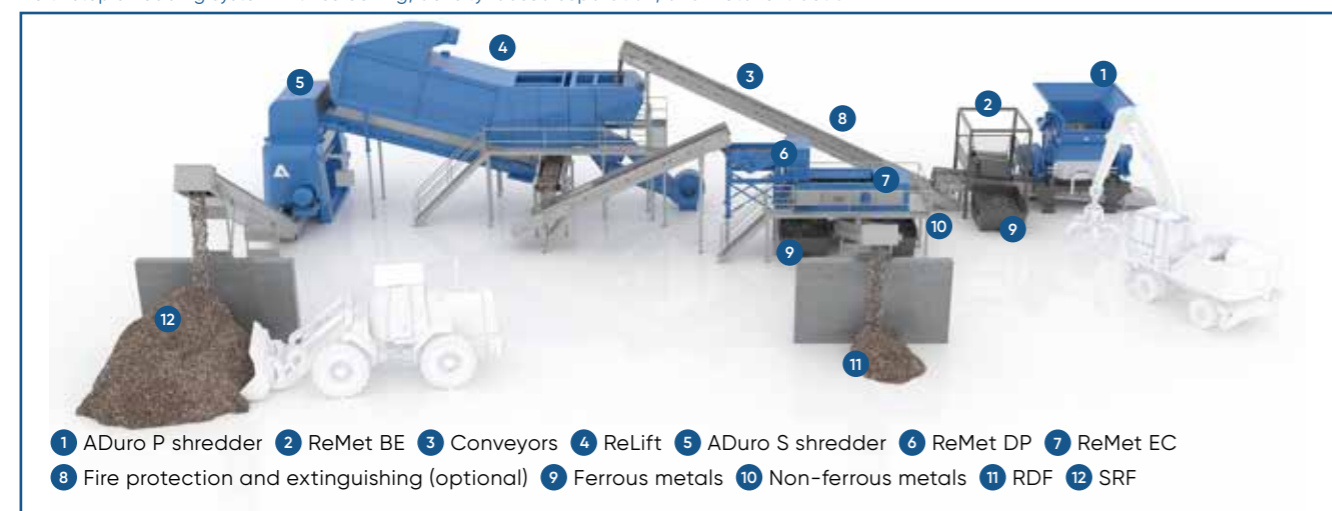
## INPUT

- Household and industrial waste
- Production residues
- Bulky waste

## OUTPUT - RDF AND/OR SINGLE FRACTIONS

- Ferrous fraction
- Non-ferrous fraction
- Plastics
- Textiles
- PVC
- Paper

Multi-step shredding system with screening, density-based separation, and metal extraction



# Benefit from tailored solutions

In an era where fuel substitution and resource efficiency are ever more critical, ANDRITZ offers customized solutions for refuse-derived fuel (RDF) production. Each step, from shredding and screening to drying and metal separation, is fine-tuned to deliver high-quality fuels for waste-to-energy and industrial applications.

Two-stage shredding system, bunker, dryer and pelleting stage



1 ADuro P shredder 2 ReMet BE 3 Conveyors 4 ReLift 5 ADuro S shredder 6 Bunker 7 Dryer 8 Pelleting Stage

## Options:

- Silo and bunker systems
- Dosing systems
- ANDRITZ power boiler
- Fire protection and extinguishing

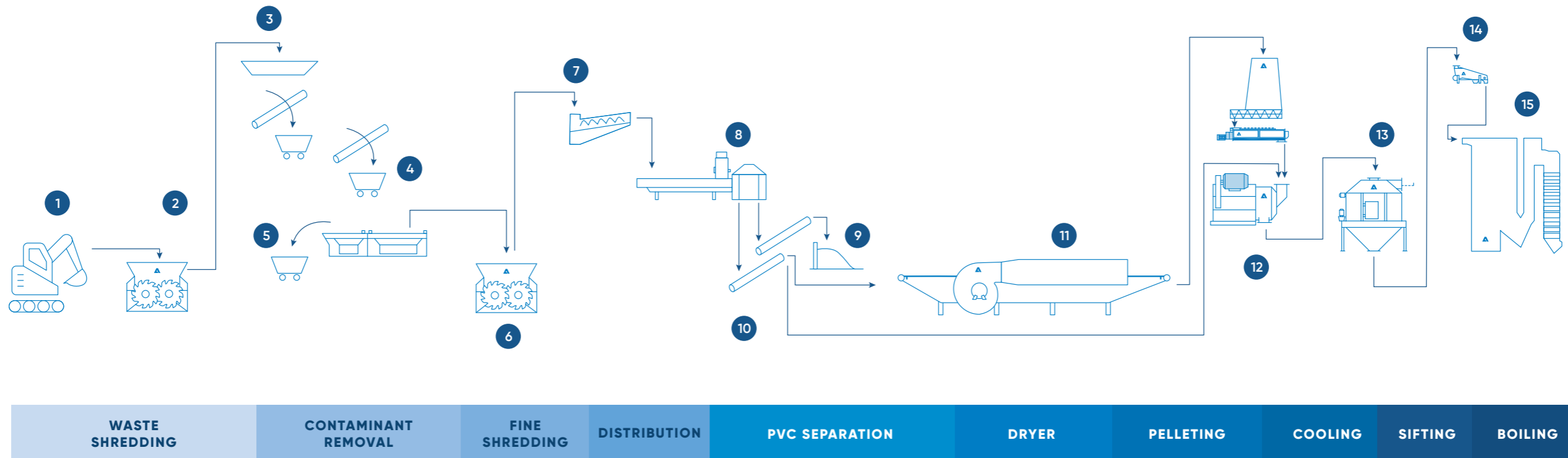
## HIGHLIGHTS

**Combined ANDRITZ technologies:** Integrated shredding, sorting, drying, and pelletizing to recycle waste into organic and inorganic components.

**Metal recovery:** 98% purity in steel scrap and non-ferrous metals.

**Fuel processing:** Non-recyclable residuals converted into fuel.

# ANDRITZ key technology for RDF & SRF production



1 WASTE LOADING

2 PRE-SHREDDING W/DISCHARGE CONVEYOR

3 FE-REMOVAL

4 STONE TRAP OR WIND SHIFTER

5 SAND SEPARATION

6 FINE SHREDDING W/DISCHARGE CONVEYOR

7 PRODUCT DISTRIBUTOR

8 PVC SEPERATOR

9 PVC SEPARATED

10 CLEANED PRODUCT

11 BELT DRYER

12 PELLETING

13 COOLING

14 SIFTING

15 BOILING

## PELLETING

ANDRITZ offers two types of waste pellet mills that each ensure high output and effective pellet quality control. These pellet mills have been engineered to withstand high forces, and feature replaceable wear parts. ANDRITZ pellet mills offer a level of process control that ensures high flexibility and maximum energy utilization.

## BOILING

The ANDRITZ boiling process combines precisely engineered fuel preparation with two advanced combustion technologies, EcoFluid and PowerFluid, to handle a wide range of fuels from sludge and biomass to rejects and RDF. After optimized combustion, an integrated flue gas cleaning system ensures reliable emission control and stable plant performance. This holistic approach enables efficient energy recovery, high operational flexibility, and consistent results across varying heating values and fuel qualities.

# ADuro P – key equipment for RDF

With its innovative, robust cutting system, this heavyweight shredder is capable of high throughput even in demanding applications. It can process large volumes of a variety of bulky materials reliably and efficiently.

The robust ADuro P is a slow-running, single-shaft shredder with electric motor drive and a hydraulic pendulum pusher. The shredder features an innovative cutting system that can produce particle sizes down to 20 mm, which is unusual for a pre-shredder. The screen is adaptable and can be modified to enable extremely high throughput for a variety of applications.

The unique design allows the ADuro P to function very well as a one-step processing unit. When processing smaller particle sizes, the ADuro P can be easily combined with other ANDRITZ ADuro shredders to achieve the desired material size.

## INNOVATIVE CUTTING SYSTEM

The cutting unit consists of low- and high-positioned knives mounted on the rotor. The incoming material

is cut between the knives and counter knives as well as the knives and screen, which ensures uniform breakdown of materials and consistent results. No rotor cooling system is required. The knife system features optimized cutting geometry to even cleanly cut bulky materials into the proper size. The rotor operates continuously to ensure high throughput and maximum efficiency.

The ADuro P can be equipped with special rotor types featuring smaller teeth and an increased rotor speed, which results in higher throughput and smaller output size. The new ADuro P-F (down to 35 mm) and ADuro P-X models (down to 20 mm) have the same robust design as the standard model, but are especially designed for processing refuse-derived fuels (RDF) and plastics in one step.



## YOUR BENEFITS AT A GLANCE

- Robust single-step shredding, even capable of reducing bales to 20 mm with ADuro P-F and P-X shredders
- Efficient removal of the metal fractions
- Secondary shredding with ADuro S shredder and custom screen sizes
- Various separation steps possible (sifting, sorting and screening)
- ADuro F shredder for finely-shredded RDF - perfectly for the cement industry
- High-quality substitute fuel fractions



**WATCH THE ADuro P**  
RDF production at Energie AG, Italy

# ADuro P – rotor designs

	P-2000 / P-3000	P-2000F / P-3000F	P-2000X / P-3000X
Chamber volume [m <sup>3</sup> ]	8 / 12	8 / 12	8 / 12
Net weight [kg]	26,000 / 36,000	26,000 / 36,000	27,000 / 37,000
Nom. operating speed [rpm]	60	60 or 85	85
Power [kW]	2x110   2x132 2x160   2x200	2x132   2x160 2x200   2x250	2x132   2x160 2x200   2x250
Rotor length [mm]	2,000 / 3,000	2,000 / 3,000	2,000 / 3,000
Rotor diameter [mm]	800	800	800
Teeth [pcs]	42 / 63	87 / 129	205 / 305
Teeth dimension WxH [mm]	100x100	70x70	50x50
Output size	coarse	fine	extra fine



ADuro P



ADuro P-F



ADuro P-X

**“We want to be a valuable partner for our customers. With our tailor-made solutions, we can adapt our system to the specific needs of our customers, thus optimizing their processes.”**

**Johannes Stindl**  
Director Global Product  
Management Recycling  
at ANDRITZ



# ADuro S - next-generation secondary shredding

A compact machine with a robust design - the ADuro S shredder is an innovative and flexible secondary shredder from ANDRITZ Recycling. With a maximum rotor length up to 3,200 mm and unique design features, the machine is a powerful tool for shredding most types of waste.

Easy to run, operate and maintain, the ADuro S shredder can be used with a variety of different waste products. Designed primarily for use with refuse-derived fuels (RDF), municipal solid waste (MSW), solid recovered fuels (SRF), and commercial and industrial waste (C&I), this machine can be used wherever a robust secondary shredder is required. Developed for high throughput with low energy consumption, it is extremely durable and provides high performance. Certain technical features make the machine flexible so that it can be used with different materials to achieve optimum results.

## INNOVATIVE FEATURES FOR HIGH AVAILABILITY

The powerful ADuro S is outstanding due to its special design. The Intelligent Pusher Control can detect the pressure, rotation speed and power consumption of

the shredder according to the machine load and uses the data to continuously control the pusher pressure and speed in order to ensure continuous cutting of the material with a high throughput. In addition, the rotor has a special design that prevents the ropes from being wrapped around the rotor.

To deal with large impurities in the input material that cannot be shredded, the ADuro S has a safety mechanism in place which stops the machine so that impurities can be easily removed, even if the machine is filled with material. The shredder can then be restarted immediately with the cutting chamber still full, thus reducing any necessary process downtime.



## YOUR BENEFITS AT A GLANCE

- Large cutting width up to 3,200 mm
- Low input energy and low power consumption
- High throughput and performance
- High availability and durability
- Flexibility of three different rotor types
- Knife holder exchange system available
- Easy knife gap adjustment
- Inside pusher
- Large maintenance openings for maintenance and repair available
- IIoT features



**WATCH THE ADuro S**  
next generation in secondary shredding

# ADuro S - rotor designs

ADuro rotor Integral	ADuro rotor Tough	ADuro rotor Swift
6 or 7 rows	6 rows	8 rows
Light design	Easy knife change	Easy knife change
Welded knife holders	Screw-on knife holders	Screw-on knife holders
Optimal cutting outline	Minimal rotor wear	Maximized efficiency
Perfect for RDF applications	Perfect for RDF applications	Perfect for processing rough materials like hard plastics



# ADuro F - efficient grinding with less dust

The ADuro F is ideal for fine grinding challenging materials, producing fractions from 15 mm down to the finest powder.

The ADuro F is used for efficient fine grinding of pre-shredded input material down to a very accurate granulate size and even finest powder, while keeping dust to an absolute minimum. The ADuro F is capable of grinding various materials such as RDF, pre-shredded PET, textiles as well as fibrous materials like paper, straw and wood. The ADuro F is often combined with an ADuro U shredder to pre-shred the input material.

The input material with a particle size of 20 to 50 mm is usually fed into the machine with a screw or band conveyor. The machine offers several options for prefiltering harmful contaminants. All inlet chute

models are equipped with a permanent magnet to remove ferromagnetic particles. Furthermore, there is an option to install a larger inlet chute with an extra stone trap.

The cutting unit consists of hammers that are mounted on the rotor. Once the material has been ground to the proper size, air flow from an integrated fan pushes the ground material through a screen with very fine mesh. This minimizes the amount of dust generated and maximizes the throughput efficiency of the ADuro F. The machine is capable of producing a fraction with very high quality and accurate granulate size, which ranges from 15 mm down to finest powder.

	ADuro F-260	ADuro F-450	ADuro F-450X
Power [kW]	55-75	160-200	315
Inlet [mm]	260	450	450
Weight [kg]	1,300	3,900	5,500
Air volume [m <sup>3</sup> /h]	4,000-5,000	8,000-10,000	~ 13,000
Screen plates [pcs]	8	16	16
Max. capacity [ton/h]*	1.2	2.3	3.0

\* for RDF: screen size 10 mm, density 150 kg/m<sup>3</sup>, pre-shredded to <50 mm



ADuro F with integrated fan



Pre-shredded material before and after grinding with ADuro F

# ReLift - optimizing material separation

The ANDRITZ Air Separator ReLift is used for the pneumatic separation of two fractions of different densities.

The material to be separated is distributed to the vibration table via a feeding equipment and conveyed further. In the further course of the process, recycled air from the recirculation system is fed into the equipment. Fill level monitoring ensures a constant material flow. Subsequently, the light material is separated from the heavy material by means of pneumatic conveying via at least one suction point, which can be adjusted according to the requirements. Heavy material falls at the end of the vibration table.

## YOUR BENEFITS AT A GLANCE

- Motor with frequency converter to adjust the vibration speed of the vibration table
- Different eccentric shaft for bigger vibration amplitude
- Adjustment of suction points with linear actuators
- Control the flow speed at the suction points by increase or decrease the air flow

	ReLift-600	ReLift-1000	ReLift-2000
Width [mm]	600	1,000	2,000
Power [kW]	2.2	3	5.5
Weight [kg]	2,000	3,500	6,300
Air volume [m <sup>3</sup> /h]	8,000	15,000	30,000
Suction points	1	1	2
Max. capacity [ton/h]*	2.5	5	10

\* for RDF: density 150 kg/m<sup>3</sup>, grain size around 50 mm



ANDRITZ ReLift-600



## OUR ENVIRONMENT IS A TREASURE TO BE PRESERVED

So are the raw materials contained in your waste products. Let us help you utilize them to your advantage. ANDRITZ Recycling is actively demonstrating its commitment to conserving valuable resources by offering a wide range of capabilities in the recycling industry. Our technologies cover solutions for processing rejects from the paper industry, e-scrap, metal and special waste, organic waste, end-of-life vehicles, wood, plastic, and textile waste as well as applications for generating energy from various waste products.

ANDRITZ Recycling Service develops recycling solutions that pay off for our customers throughout the entire lifecycle of their mills or equipment. Our services range from the timely supply of spare parts and routine maintenance work during scheduled shutdowns to swift response and support during unexpected disruptions or implementation of our latest IIoT solutions. Our team is dedicated to keeping your operations running smoothly and efficiently.

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